ARGUMENTS/REMARKS

Claims 1 through 19 are pending in the present application. Claims 1, 10, 11, 14 and 15 through 19 have been amended to claim the full scope of the invention. New claim 20 has been added.

In the Office Action, claim 10 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 10 has been amended appropriately. Reconsideration and withdrawal of the 35 U.S.C. 112, second paragraph, rejection are respectfully requested.

In the Office Action, claims 1, 3, 4, 14 and 15 were rejected under 35 U.S.C. 102(b) as being clearly anticipated by either U.S. Patent No. 4,204,872 to Hayati et al. (hereinafter "the Hayati et al. patent"), U.S. Patent No. 3,894,572 to Moore, Jr. (hereinafter "the Moore, Jr. patent"), or U.S. Patent No. 3,616,840 to Dunlop (hereinafter "the Dunlop patent").

Claim 1 is directed to a method for the production of a shell mould. Claim 1 provides for the steps of (i) dipping a preformed expendable pattern into a slurry of refractory particles and colloidal liquid binder whereby to form a coating layer on the pattern, (ii) depositing particles of refractory material onto the coating, and (iii) drying. Steps (i) to (iii) are repeated as often as required to produce a shell mould having a primary coating layer and at least one secondary coating layer, wherein during at least one performance of step (ii) a gel-forming material is also deposited onto the coating layer formed in step (i). After contact with the coating layer, moisture is absorbed by the gel-forming material thereby causing gelation of the colloidal binder so reducing the time required for drying in step (iii).

Claim 14 directed to a shell mould. Claim 14 provides that the shell mould is produced by (i) dipping a preformed expendable pattern into a slurry of refractory particles and colloidal liquid binder whereby to form a coating layer on the pattern, (ii)

depositing particles of refractory material onto the coating, and (iii) drying. Claim 14 also provides that steps (i) to (iii) are repeated as often as required to produce a shell mould having a primary coating layer and at least one secondary coating layer, wherein during at least one performance of step (ii) a gel-forming material is also deposited onto the coating layer formed in step (i), such that after contact with the coating layer, moisture is absorbed by the gel-forming material thereby causing gelation of the colloidal binder so reducing the time required for drying in step (iii).

Claim 15 is directed to an unfired precursor to a shell mould for producing a casting. Claim 15 provides for a precursor having a shell with a cavity therein in the shape of the casting. The shell has a plurality of layers, wherein at least one of the layers has a gel-forming material containing absorbed moisture, refractory particles and gelled colloidal liquid binder.

The Hayati et al. patent is directed to a preparation of high temperature shell molds. The Hayati et al. patent discloses a coating, stuccoing and drying sequence that is repeated until the desired coating thickness is achieved and then a sealing coat is applied, as desired.

The Moore, Jr. patent is directed to a process for forming a refractory laminate. The Moore, Jr. patent discloses a method of forming a refractory laminate on the surface of a support structure which comprises dipping the structure into a bath of a sol of positively charged colloidal particles form a coating on the surface, and applying to the surface a particulate refractory material containing a chemical setting agent.

The Dunlop patent is directed to a method of making multilayer shell molds. The Dunlop patent discloses shell molds that are prepared by repeatedly applying to a pattern a slurry containing sodium or potassium silicate, removing the pattern from the slurry and coating it with refractory material, and then applying a phosphorous-containing gelling agent until a desired thickness is achieved.

Claims 1 and 14 have been amended to recite that the gel-forming material absorbs

moisture upon contact with the coating layer, thereby initiating gelation of the colloidal binder. Claim 15 has been further amended to recite an unfired precursor to a shell mould, rather than the shell mould itself.

Neither the Hayati et al. patent, the Moore, Jr. patent, nor the Dunlop patent anticipate claims 1, 3, 4, 14 or 15. In particular, none of the cited prior art discloses that the gel forming material absorbs moisture following contact with the coating layer, thereby causing gelation of the colloidal binder. In contrast, any gelation in the cited prior art is produced by chemical reaction of the gel-forming material, rather than absorption of moisture. In the prior art, the coating material used to gel the colloid will react with the binder system and become an integral part of the shell's structure. This has undesirable consequences for the hot strength of the resulting shell.

In the Office Action, claims 2 and 10 were rejected under 35 U.S.C. 102(b) as being clearly anticipated by the Hayati et al. patent. For the reasons set forth above with respect to claim 1, the Hayati et al. patent also does not anticipate claims 2 and 10 of the instant application. New claim 20, which depends from dependent claim 10 is also allowable for the same reasons. Reconsideration and withdrawal of the 35 U.S.C. 102(b) rejection are respectfully requested.

In the Office Action, claim 9 was rejected under 35 U.S.C. as being clearly anticipated by the Moore, Jr. patent. For the reasons set forth above with respect to claim 1, above, the Moore, Jr. patent also does not anticipate claim 9 of the instant application. Reconsideration and withdrawal of the 35 U.S.C. 102(b) rejection are respectfully requested.

In the Office Action, claims 5 through 8, 11 through 13 and 16 through 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over either the Hayati et al. patent, the Moore, Jr. patent, or the Dunlop patent. The Office Action states that it would have been obvious for those of ordinary skill in the casting art to select an appropriate gel-forming agent from among gel-forming materials for their investment molding process through routine experimentation. The Office Action further states that it would also have

been obvious to select a proper amount and particle size for the particular type of gel-forming material for the specific investment molding process. Applicants respectfully disagree.

In particular, none of the cited prior art discloses that the gel forming material absorbs moisture following contact with the coating layer, thereby causing gelation of the colloidal binder. In contrast, any gelation in the cited prior art is produced by chemical reaction of the gel-forming material, rather than absorption of moisture. In the prior art, the coating material used to gel the colloid will react with the binder system and become an integral part of the shell's structure. This has undesirable consequences for the hot strength of the resulting shell. For at least these reasons, claims 5 through 8, 11 through 13 and 16 through 19 are not obvious in view of the prior art.

Claims 1 through 19 were provisionally rejected on the ground of non-statutory double patenting. Upon the allowance on the present application, Applicants will consider filing a terminal disclaimer should the application grant.

Consideration and allowance of application is respectfully requested.

Respectfully submitted,

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Date

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